

Briefing Book



U.S. Department of Energy Portsmouth Gaseous Diffusion Plant

2007

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2-27-09

Gaseous Diffusion Plants History

- ▶ 3 plants were operated by DOE and predecessor agencies to enrich uranium for the nation's nuclear weapons program and for commercial nuclear reactors
- ▶ K-25 in Oak Ridge— 1st plant. Ceased operations in 1985 (now known as East Tennessee Technology Park (ETTP))
- ▶ Portsmouth, Ohio: Plant operated 1954-2001. In Cold Standby from 2001 through September 2005; Currently in Cold Shutdown preparing for Decontamination & Decommissioning
- ▶ Paducah, Kentucky: Only uranium enrichment plant currently operating in US
- ▶ 1992 Energy Policy Act established the United States Enrichment Corporation (USEC)
 - *USEC Privatization Act* signed into law in 1996
 - Nuclear Regulatory Commission assumed regulatory oversight in 1997
- ▶ DOE leases Portsmouth and Paducah facilities to USEC
- ▶ DOE retains ownership of plants and responsibility for environmental cleanup of past operations and Decontamination & Decommissioning (D&D) of plants once USEC returns leased facilities to DOE

Portsmouth Site History

- ▶ Department of Energy (DOE) reservation is 3,714 acres; 1,200 acres are inside perimeter road
 - ▶ Construction of the plant began in late 1952
 - ▶ First process cell on stream in September 1954
 - ▶ Ceased production of weapons material in 1964
 - ▶ Construction of the Gas Centrifuge Enrichment Plant (GCEP) began in 1979 and ended in 1985
 - ▶ Highly Enriched Uranium (HEU) production was suspended in 1991
 - ▶ Privatization of United States Enrichment Corporation (USEC) in July 1998; ceased enrichment operations May 2001
 - ▶ DOE signs contract with USEC for Cold Standby August 2001
 - ▶ USEC announces Lead Cascade at PORTS December 2002 / American Centrifuge in January 2004
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Portsmouth Gaseous Diffusion Plant

- ▶ The Portsmouth Gaseous Diffusion Plant occupies about 1,200 acres of a 3,714-acre site owned by DOE
- ▶ About 28,000 people live in Pike County, Ohio, where plant is located
- ▶ The United States Enrichment Corporation leases production facilities — regulated by Nuclear Regulatory Commission (NRC)
- ▶ The USEC and DOE-related jobs employ about 1,700 people
- ▶ DOE EM work is regulated under state and federal laws
- ▶ Environmental Restoration and Waste Management both are funded by the D&D Fund.

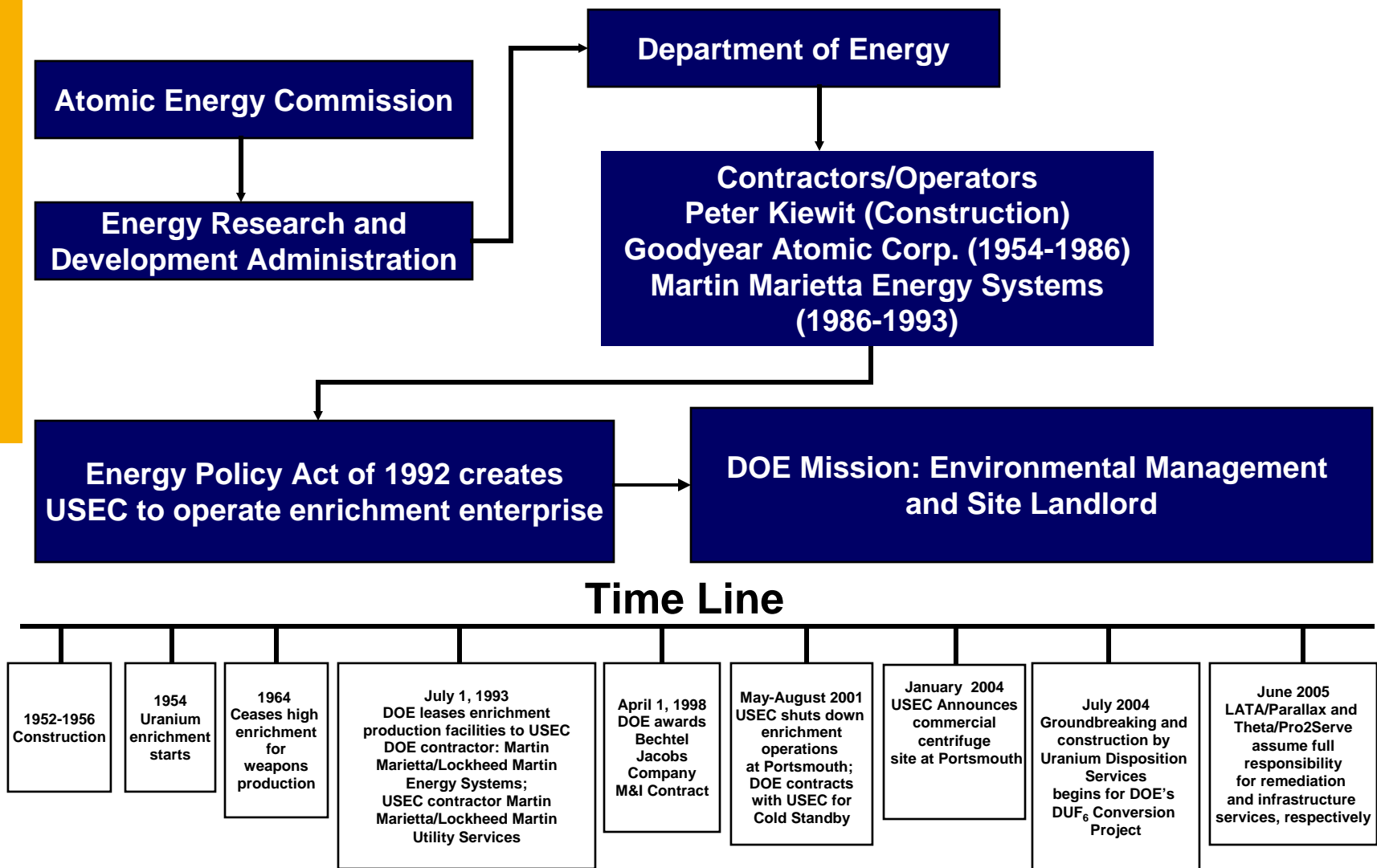


Aerial view of the Portsmouth Gaseous Diffusion Plant looking south

DOE Primary Responsibilities:

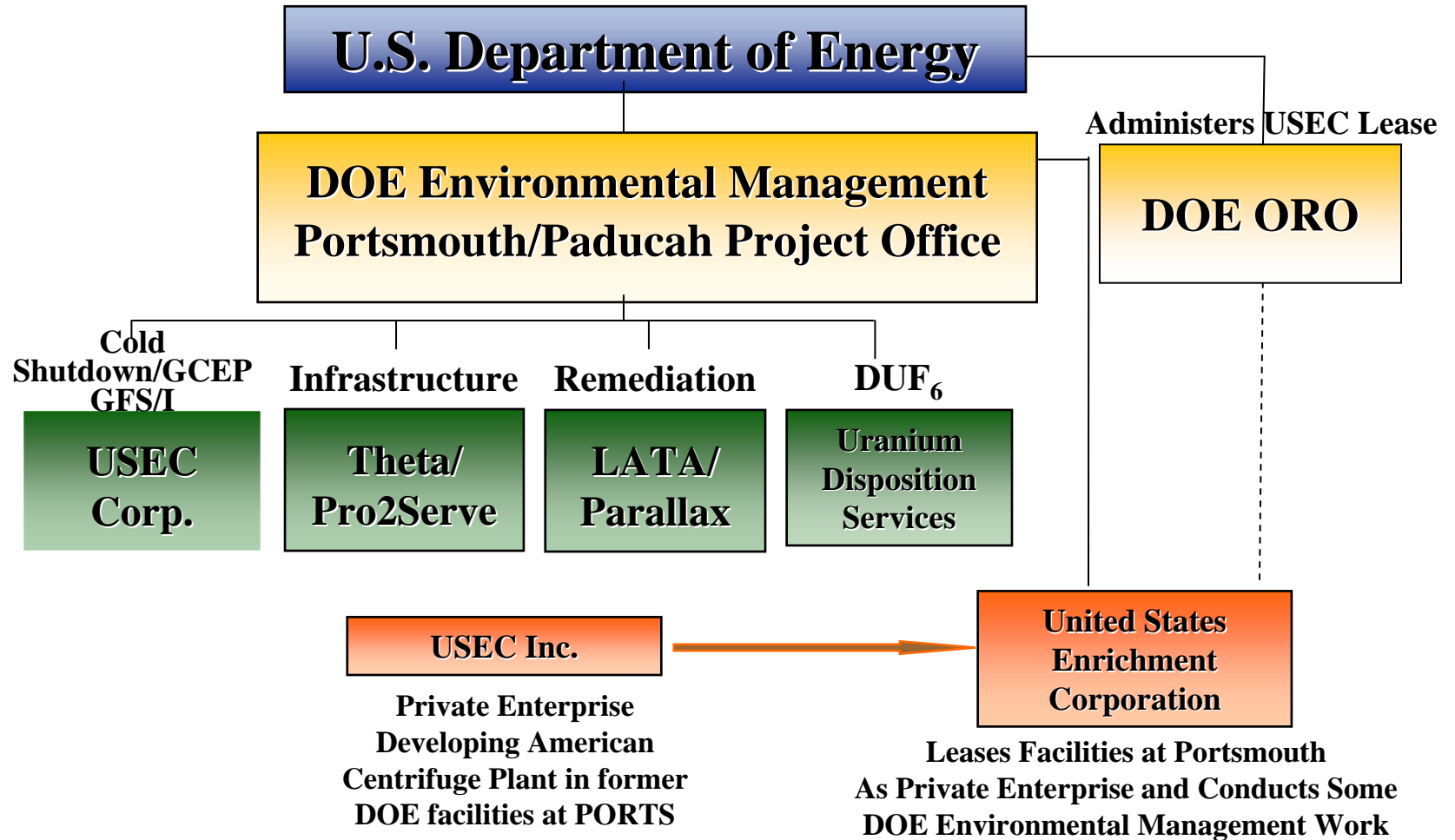
- ▶ legacy waste storage, treatment and disposal
- ▶ management of DUF_6 cylinders
- ▶ remediation of environmental contamination
- ▶ infrastructure surveillance and maintenance

Historic Overview of Plant Operations



DOE/Contractor Interface at Portsmouth

Portsmouth Site Interfaces



History of DOE EM Work at Portsmouth 1990-91



X-701B Holding Pond

Contaminated sludges and soils removed from X-701B Holding Pond and Sludge Containment Ponds

First public meeting held on cleanup program

1990



X-616 Before



X-616 After

Two lagoons containing chromium sludge were remediated

1,100-foot trench system and treatment facility constructed to prevent migration of groundwater into Little Beaver Creek



X-701B Interceptor Trench Construction

1991

History of DOE EM Work at Portsmouth **1992-93**



In situ soil mixing field demonstration successfully completed at X-231B Oil Biodegradation Plots

Completed closure of the X-749 Low Level Waste Landfill

1992



The EIC provides copies of documents relating to DOE's work at Portsmouth.



DOE responsible for environmental monitoring and restoration, depleted uranium, and waste treatment and disposal operations

DOE opened Environmental Information Center

DOE leased enrichment production facilities to USEC

1993

History of DOE EM Work at Portsmouth 1994-95



X-749A Cap



X-749 IRM

Multi-layered soil cap installed over a 6-acre classified materials landfill

1,077-foot subsurface clay mortar barrier wall installed to prevent solvent-contaminated groundwater from migrating off-site

1994



X-735 Landfill



X-625 Facility

Northern portion of the X-735 Sanitary Landfill closed in July 1995

New passive groundwater treatment facility constructed

RCRA Part B Waste Storage Permit approved in August 1995

1995

History of DOE EM Work at Portsmouth **1996**



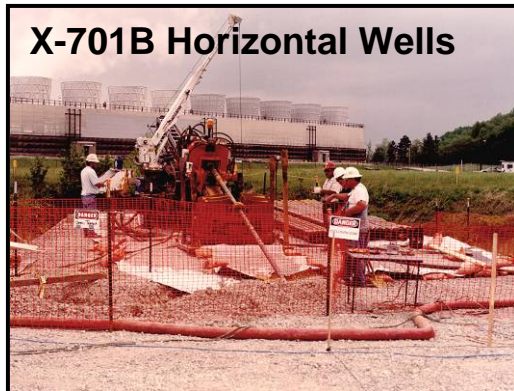
PORTS is first DOE site to use Envirocare commercial mixed waste disposal facility

Completed first Decontamination & Decommissioning (D&D) project by demolishing a closed incinerator

Project completed to remediate 18 acres of lime sludge lagoons and convert to prairie ecosystem

1996

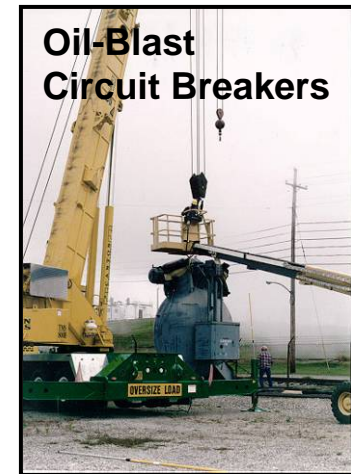
History of DOE EM Work at Portsmouth **1997**



X-701B Horizontal Wells



Shipment of X-701B Soils



**Oil-Blast
Circuit Breakers**

Parallel horizontal wells installed to test recirculation groundwater treatment at X-701B plume area; geotextile fabric and soil cover placed over former incinerator in September 1997

Major waste management milestone achieved in April 1997 with shipment completion of 852 boxes of X-701B soils

1.6 million pounds of non-rad transformers, PCB articles shipped for recycling

1997

History of DOE EM Work at Portsmouth 1998-99



X-701B Steam Stripping

Peter Kiewit Landfill



DOE launched 3 pilot treatment projects to demonstrate innovative cleanup techniques

Peter Kiewit Landfill cap completed

First quadrant-wide cleanup study approved by Ohio EPA

4 million pounds of waste shipped off-site

1998



X-740

Phytoremediation

Phytoremediation project completed at X-740 plume area

Fernald uranium material shipped to Portsmouth for interim storage

Began X-734 landfill cap construction signifying last landfill to be remediated

1999

X-734 Landfill Cap



History of DOE EM Work at Portsmouth **2000-2001**

**X-747H Scrap
Metal Yard**



X-734 Landfill

X-734 Landfill Closure Completed

More than 6 million pounds of X-616
Chromium Sludge Shipped to
Envirocare

RCRA Part B Permit Renewed for 5
Years

Initiated Scrap Metal Removal Project

2000

**X-701C
Neutralization Pit
oxidant treatment**



**X-701A Lime
House**

Demolition of X-701A Lime House and
Removal of X-701C Neutralization
Pit, treating remaining soils with
oxidant

Completed installation of alternate
heat source for EM facilities

Emptied seven warehouses of
187,000 drums of lithium hydroxide
sold to private vendors

2001

History of DOE EM Work at Portsmouth **2002-2003**



5-Unit Groundwater
Well Drilling

X-749 Barrier Wall



Completed the 5-Unit Groundwater
Treatment System

Completed upgraded to X-622
Groundwater Treatment Facility

Completed the X-749 Barrier Wall

Completed Phase 1 of X-749/120
Phytoremediation System

2002

**X-747H Scrap
Metal Yard**



**X-749/120
Phyto-
remediation**

Completed Final Phase of X-749/120
Phytoremediation System

Reduced over 50% of Scrap Metal

Received Certification to Nevada Test
Site for Waste Shipments

Dispositioned 3,000 waste containers

2003

History of DOE EM Work at Portsmouth **2004**



X-627 Construction Completed

DUF₆ Cylinders Transferred From Oak Ridge to Portsmouth



DUF₆ Conversion Facility Construction Initiated

- X-627 Groundwater Treatment Facility completed
- 2,016 UF₆ cylinders transferred from Oak Ridge, Tennessee, to Portsmouth in 2004
- Phase I of Scrap Metal Removal Project completed
- DUF₆ Conversion Facility construction began

History of DOE EM Work at Portsmouth **2005**

Scrap Metal Removal

**Completed removal
of 8,400 tons of
scrap metal in
inventory**



History of DOE EM Work at Portsmouth **2005**

DUF6 Conversion Design and Construction

Construction of
underground
utilities completed

Foundation work
started on
administration,
warehouse, and
conversion
process building



Depleted Uranium Hexafluoride (DUF6) Conversion Plant Construction

History of DOE EM Work at Portsmouth **2005**

Groundwater Remediation

X-701B groundwater plume treatment is last major cleanup action to be completed prior to plant D&D

Phase I oxidant injection and post-injection groundwater/soil sampling completed November 2005

Total project scheduled for completion by 2009



X-701B Oxidant Injection Project

History of DOE EM Work at Portsmouth **2006**

Inactive Facility Removals

Safely removed 13 of 14 inactive, surplus facilities listed on current contract with the Dept. of Energy

Removals eliminate all future surveillance and maintenance costs



X-105 Electronic Maintenance Building



X-615 Old Sewage Treatment Plant

History of DOE EM Work at Portsmouth **2006**



Late 1990s

Legacy Waste Disposition



Same Area
August 18, 2006

Completed RCRA Closure activities on 9 areas covering 84,000 square feet

Shipped more than 7,200 containers of waste off-site (excluding GCEP) for final disposition; completion scheduled in FY 2007



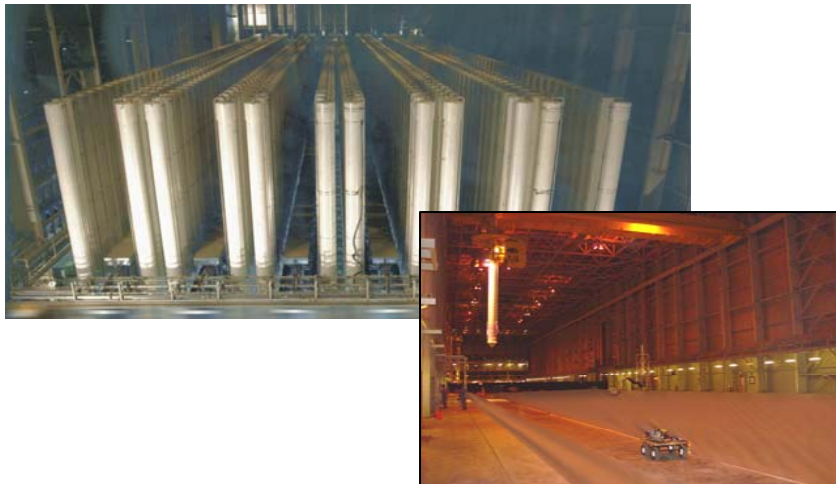
Initiated project to remove 438 old converter shells (equipment removed from gaseous diffusion process buildings)

Disposal taking place at Nevada Test Site

Completion expected by end of FY 2008

History of DOE EM Work at Portsmouth **2006**

Cleanout of Gas Centrifuge Enrichment Plant (GCEP) Completed



Completed seven months ahead of schedule, \$8.3 million below original project estimate

682,134 cubic feet of classified and unclassified waste shipped off site

Areas now leased to USEC for commercial centrifuge program



Cold Shutdown preparing gaseous diffusion plant for D&D

Lube oils and uranium deposit hold-ups removed

USEC activities near mid-way point of completion

Present DOE EM Work at Portsmouth

2007



**Cylinder Shipments
From East Tennessee
Technology Park (ETTP)**

**X-770 Mechanical Test
Building Removal**

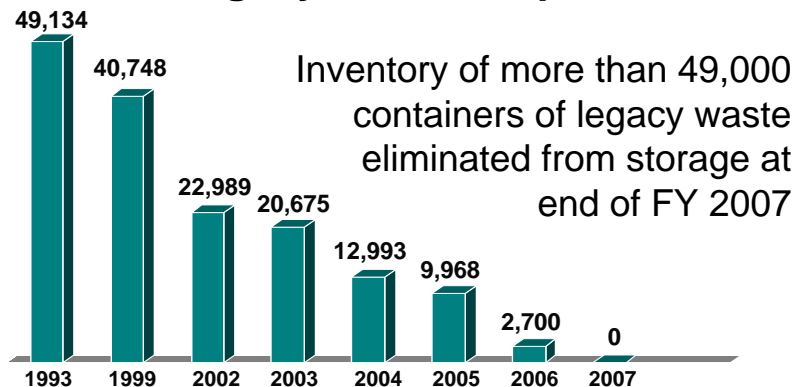


Tc-99 Removal

- Completed shipments of 6,800 UF6 cylinders from ETTP to Portsmouth under budget and 3 years ahead of schedule
- Safely removed X-770 Mechanical Test Building, last of 14 inactive facilities
- To date, more than 11,000 metric tons of uranium cleaned by USEC as part of Tc-99 Removal Project; completion expected by end of FY 2008

Present DOE EM Work at Portsmouth **2007**

Legacy Waste Disposition



On July 27, 2007, Ohio EPA Director Chris Korleski (at right) announced that cleanout of the X-7725 building (above) was completed in accordance with regulatory requirements.



Fog Road Upgrade Completed

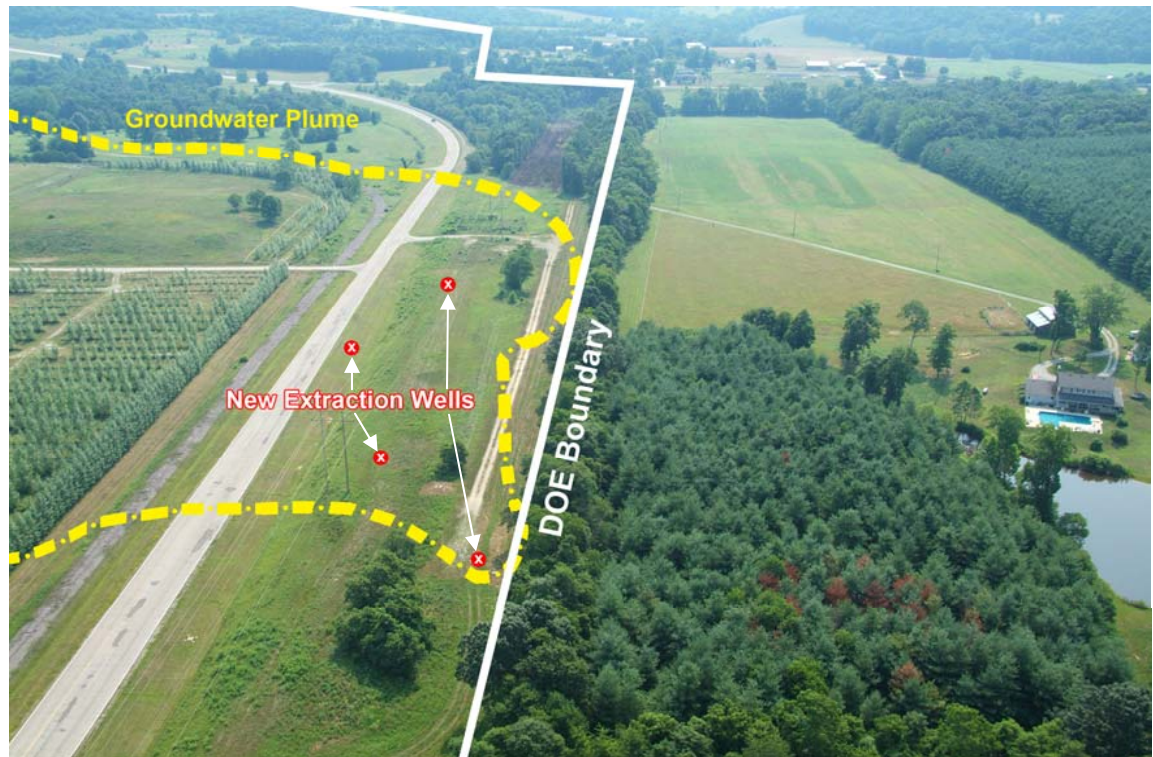


Elected officials, community members, and the Department of Energy officially opened Fog Road on November 28, 2007. Upgrades to the 1.5 mile road, completed in four months, provided improved public access around the plant site for emergency responders.

Present DOE EM Work at Portsmouth 2007

Groundwater Remediation

- Installed 4 extraction wells to mitigate plume migration at site's southern boundary
- Significant progress on X-701B plume with highest trichloroethylene (TCE) concentrations on site
- Project completion of X-701B groundwater plume expected in FY 2011



Present DOE EM Work at Portsmouth

2007

DUF6 Conversion Design and Construction

Completed more
than 90% of
conversion process
facilities

Conversion Plant
Facility

March 2007



Administration Building



Potassium
Hydroxide and
Water Treatment
Facility



Conversion Plant
Facility

Hydrogen Fluoride
Storage Tank Facility

